PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-203681

(43)Date of publication of application : 30.07.1999

(51)Int.Cl. G11B 7/00
G11B 20/10

(21)Application number : 10-101224

(22)Date of filing : 13.04.1998

(71)Applicant : HITACHI LTD

(72)Inventor : UEKI YUKIYA
HIROSE KOICHI

(30)Priority

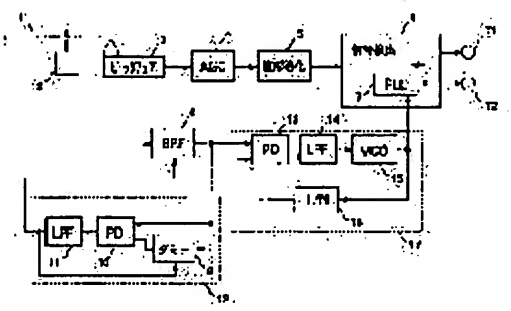
Priority number : 09315440 Priority date : 17.11.1997 Priority country : JP

(54) OPTICAL DISK DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent a wobbling signal frequency band from drifting from a signal pass-band of a band-pass filter for extracting the wobbling signal.

SOLUTION: A band-pass filter 8 for extracting a wobbling signal is composed of an active filter circuit of which a cut-off frequency is variable, and is provided with a filter control circuit 12 generating a signal for controlling the cut-off frequency of the band-pass filter 8 by using a dummy circuit 9 referring to the wobbling signal. Thus, even if the wobbling signal read from an optical disk 1 changes in the frequency, the signal pass-band of the band-pass filter 8 follows up the change and this does not cause inconvenience.



LEGAL STATUS

[Date of request for examination] 28.02.2002

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application

converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the optical disk unit using the optical disk which recorded the wobble signal including the signal which start the optical disk unit which used the optical disk, and the truck currently especially formed on the disk is made to surge, and serves as criteria of record and playback of an information signal, and the optical disk unit which can both play the optical disk which recorded the wobble signal, and the optical disk which does not use a wobble signal.
[0002]
[Description of the Prior Art] The truck which records the information signal currently formed in the disk as a pit train as an optical disk unit in which the conventional account rec/play student is possible is made to surge, the thing of the method which records the wobble signal containing the signal used as the criteria of record and playback of an information signal, address information, etc. there is known, and the technique indicated by JP,7-161132,A etc. is known as this kind of equipment.
[0003]
[Problem(s) to be Solved by the Invention] When reading the disk recorded in the constant linear velocity as rotational-speed regularity at the time of playback, the frequency of the wobble signal read by the optical pickup or an information signal changes a lot in the inner circumference part and periphery part of a disk. Moreover, if it is going to process before being completed as a predetermined value by disk rotational speed, in order to bring playback read-out forward in case a track jump tends to be carried out to a periphery or its reverse and it is going to read from disk inner circumference, even when reproducing in a constant linear velocity, it will read similarly and change of signal frequency will arise. furthermore, in order to accelerate playback read-out, the frequency of the signal boiled, taken and read which accelerates disk rotational speed with the twice of a predetermined value and 3 times also changes to twice, 3 times, and a broadband.
[0004] Therefore, if the extract filter is made into a narrow-band when extracting a wobble signal from the signal read by the optical pickup, wobble signal frequency and the signal passband of an extract filter shift, a wobble signal will decline and a signal extract will not be carried out. Moreover, if it is made a broadband, since the read-out signal of a noise or others will be mixed and outputted to a wobble signal, un-arranging [that S/N deteriorates] arises. Moreover, the correspondence to S/N reservation and signal lack -- the truck with which a wobble signal is recorded becomes intermittent by positional information etc. being minced as a pit at the head of a truck, or the wobble signal of the part is missing with the defect by a blemish etc. -- is needed.
[0005] Moreover, the signal band and circuit characteristic strip region which were read in the optical pickup need to be in agreement similarly about the circuit which processes the signal read from the optical pickup besides the above-mentioned extract filter, for example, the waveform equalization circuit which emphasizes the high frequency band which the read information signal decreased, and amends frequency characteristics, and the phase lock loop which reproduces the clock signal used as the criteria of record and playback of an information signal.
[0006] Furthermore, within IC, in case circuits, such as these extract filter and a waveform equalization circuit, are integrated, since there is absolute value dispersion of resistance or a capacitor element, un-arranging [which produces dispersion in the time constant property using these components] arises.
[0007] And when using an optical disk unit as information storage devices, such as a computer, there is also an optical disk of the method which is not recording the wobble signal, and it can be necessary to correspond also to such an optical disk.

[0008]
[Means for Solving the Problem] Then, it sets to the optical disk unit using the optical disk which recorded the wobble signal including the signal which the truck currently formed on the disk is made to surge in this invention, and serves as criteria of informational record and playback. The pickup circuit where the 1st means reads a signal from an optical disk at least, The extract filter which can carry out adjustable [of the time constant which extracts a wobble signal from the signal read in the pickup circuit], By controlling the time constant of an extract filter by the control signal which was equipped with the filter control circuit which generates the control signal according to frequency change of the wobble signal outputted from the extract filter, and was generated in the filter control circuit It operates so that the time constant of an extract filter may always follow wobble signal frequency. By this, it can cancel un-arranging [that a wobble signal band and the signal passband of an extract filter will shift], and the resistance at the time of moreover integrating and time constant fluctuation of the extract filter by absolute value dispersion of a capacitor element are amended similarly.
[0009] Moreover, the time constant circuit of the circuitry using the time constant component in which the 2nd means has an extract filter and correlation in the above-mentioned optical disk unit for example, the waveform equalization circuit which emphasizes the high frequency band which the information signal read in the pickup circuit decreased, and amends frequency characteristics -- With the control signal which was equipped with the phase lock loop containing the oscillator which carries out the playback output of the clock signal which serves as criteria from the wobble signal outputted from the extract filter etc., and was generated in the filter control circuit While operating by controlling the time constant of an extract filter and a time constant circuit so that the time constant of an extract filter may always follow wobble signal frequency Since the time constant of a time constant circuit also interlocks and is followed, it can cancel un-arranging [that the signal band and the characteristic strip region of a time constant circuit which were read from the optical disk will shift], and is similarly amended about the resistance at the time of integrating, or the time constant fluctuation by absolute value dispersion of a capacitor element.
[0010] Moreover, the pickup circuit where the 3rd means reads a signal from an optical disk at least in an optical disk unit, The servo circuit which controls the rotational speed of an optical disk, and the location of the optical pickup included in a pickup circuit, The extract filter which can carry out adjustable [of the time constant which extracts a wobble signal from the signal read in the pickup circuit], It has the filter control circuit which generates the 1st control signal according to frequency change of the wobble signal outputted from the extract filter. A servo circuit Based on the rotational speed of an optical disk, and the positional information of an optical pickup, the 2nd control signal according to the frequency of the wobble signal read from the optical disk is generated. As opposed to frequency change of the signal read from an optical disk by adding the 1st control signal and 2nd control signal, and controlling the time constant of an extract filter As opposed to the time constant fluctuation by the resistance at the time of amending and integrating with the 2nd control signal, absolute value dispersion of a capacitor element, etc. Since distributed actuation is carried out so that the 1st control signal may amend, it can reach far and wide and wobble signal frequency and the time constant of an extract filter can be made in agreement.
[0011] Moreover, the pickup circuit where the 4th means reads a signal from an optical disk at least in an optical disk unit, The servo circuit which controls the rotational speed of an optical disk, and the location of the optical pickup included in a pickup circuit, The criteria oscillator circuit which generates a reference clock, and the frequency divider which a division ratio is controlled and carries out the dividing output of the reference clock, The change-over circuit which carries out the selection output of the output of the signal and frequency divider which were read in the pickup circuit, The extract filter which can carry out adjustable [of the time constant which extracts a predetermined signal band from the output signal of a change-over circuit], The filter control circuit which generates the control signal according to frequency change of the signal outputted from the extract filter, It has an extract filter and the time constant circuit of the circuitry using a time constant component with correlation. The time constant of an extract filter and a time constant circuit is controlled by the control signal generated in the filter control circuit. A servo circuit By controlling the division ratio of a frequency divider based on the rotational speed of an optical disk, and the positional information of an optical pickup The signal of the frequency same in false as a wobble signal is generated from a frequency divider. A change-over circuit When reading the optical disk which recorded the wobble signal By choosing the signal read in said pickup circuit, and supplying an extract filter When reading the optical disk of the method which

operates so that the time constant of an extract filter may follow wobble signal frequency, and is not recording the wobble signal By choosing the wobble signal which carried out false generating in a frequency divider, and supplying an extract filter It operates so that the time constant of an extract filter may follow the wobble signal frequency which carried out false generating. By this Also when there is no wobble signal, it can be made to be able to operate like the case where the optical disk which recorded the wobble signal is read, and can respond also to the optical disk of the method which is not recording the wobble signal.

[0012] Moreover, the pickup circuit where the 5th means reads a signal from an optical disk at least in an optical disk unit, The phase lock loop which reproduces the synchronous clock which carried out phase simulation to the information signal read in the pickup circuit, The frequency divider which carries out dividing of the synchronous clock, and the change-over circuit which carries out the selection output of the output of the signal and frequency divider which were read in the pickup circuit, The extract filter which can carry out adjustable [of the time constant which extracts a predetermined signal band from the output signal of a change-over circuit], The filter control circuit which generates the control signal according to frequency change of the signal outputted from the extract filter, It has an extract filter and the time constant circuit which can carry out adjustable [of the time constant] using a time constant component with correlation. The time constant of an extract filter and a time constant circuit is controlled by the control signal generated in the filter control circuit. A change-over circuit When reading the optical disk which recorded the wobble signal By choosing the signal read in said pickup circuit, and supplying an extract filter When reading the optical disk of the method which operates so that the time constant of an extract filter may follow wobble signal frequency, and is not recording the wobble signal By choosing the wobble signal which is acquired by carrying out dividing of the synchronous clock which carried out phase simulation to the information signal in a frequency divider and which carried out false generating, and supplying an extract filter It operates so that the time constant of an extract filter may follow the wobble signal frequency which carried out false generating. By this Also when there is no wobble signal, it can be made to be able to operate like the case where the optical disk which recorded the wobble signal is read, and can respond also to the optical disk of the method which is not recording the wobble signal.

[0013]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained using a drawing. Drawing 1 is the block diagram showing the configuration of the optical disk record regenerative apparatus (optical disk unit) concerning the 1st operation gestalt of this invention. In this drawing, the spindle motor with which 1 carries out an optical disk and 2 carries out support rotation of the optical disk 1, and 3 The wobble signal recorded as a wave of the information signal recorded from the optical disk 1 or a truck is read. Carry out signal magnification and the pickup circuit to output, the AGC circuit to which 4 adjusts signal amplitude to constant value, the waveform equalization circuit which carries out emphasis magnification of the high frequency band of the information signal which 5 decreased, and 6 The signal detector which carries out transform processing of the playback analog signal supplied from the waveform equalization circuit 5 to the digital signal which can be processed in a digital processing circuit, the phase lock loop where 7 is contained in a signal detector, and 8 The band pass filter (extract filter) which extracts a wobble signal from the signal read in the pickup circuit 3 and with which a time constant consists of an active filter which can carry out adjustable, and 9 The dummy circuit which consists of an active filter which can carry out adjustable [of the cut off frequency] like a band pass filter 8, A phase detector, and 11 and 14 10 and 13 A low pass filter, The filter control circuit which generates the signal with which 12 controls the cut off frequency of a band pass filter 8, the phase lock loop where 15 generates the playback reference clock to which an oscillator circuit and 16 become a frequency divider and 17 becomes criteria from a wobble signal, and T1 and T2 are output terminals.

[0014] In drawing 1 , the signal read from the optical disk 1 in the pickup circuit 3 is amplified, and the regenerative signal with which an information signal includes a wobble signal to AGC circuit 4 is supplied to a band pass filter 8, respectively.

[0015] It is inputted into a waveform equalization circuit 5, emphasis amendment of the decreased high frequency band is carried out, and the information signal adjusted to amplitude value predetermined by AGC circuit 4 is supplied to the signal detector 6. The signal detector 6 latches the information signal made binary with this synchronous clock, and outputs the synchronized information signal to an output terminal T1 while making it binary, generating a synchronous clock from the information signal made binary in a phase lock loop 7 and outputting it to an output terminal T2 for digital processing of the supplied information signal.

[0016] A band pass filter 8 extracts a wobble signal from the signal supplied from the pickup circuit 3, and the

wobble signal is supplied to the dummy circuit 9 and phase detectors 10 and 13, respectively.
[0017] A phase detector 10 generates the signal according to the phase contrast of the supplied wobble signal and the signal supplied from the dummy circuit 9, and a low pass filter 11 carries out smooth [of the output signal of a phase detector 10], and is supplied as a signal with which the output signal of this low pass filter 11 controls a cut off frequency to the dummy circuit 9 and a band pass filter 8. The filter control circuit 12 consists of these dummy circuit 9, a phase detector 10, and a low pass filter 11.
[0018] Moreover, a phase detector 13 generates the signal according to the phase contrast of the supplied wobble signal and the output signal of a frequency divider 16, a low pass filter 14 carries out smooth [of the output signal of a phase detector 13], and supplies this to an oscillator circuit 15, and controls the oscillation frequency of an oscillator circuit 15. The oscillation signal generated in the oscillator circuit 15 is supplied to a phase lock loop 7 as a reference clock for performing frequency drawing in of the above mentioned phase lock loop 7 at the same time it is supplied to a frequency divider 16 and dividing is carried out. A phase lock loop 17 consists of these phase detectors 13, a low pass filter 14, an oscillator circuit 15, and a frequency divider 16.
[0019] Next, the actuation which controls the cut off frequency of a band pass filter 8 by the filter control circuit 12 is explained in detail. First, the dummy circuit 9 has the primary phase-shifting circuit property, and the amplitude of the inputted wobble signal remains as it is, according to a frequency, it changes a phase and outputs it. And if the control signal supplied from a low pass filter 11 becomes large, the cut off frequency of the dummy circuit 9 will become high, and if the control signal conversely supplied from a low pass filter 11 becomes small, the cut off frequency of the dummy circuit 9 will become low.
[0020] An axis of abscissa is set as two input signal phase contrast of a phase detector 10, an axis of ordinate is set as the output signal of a phase detector 10, and a property Fig. is shown in drawing 2 . When two input signal phase contrast of a phase detector 10 is pi/2 (P points of drawing 2), If, as for the output signal of a low pass filter 11, constant value is held by not outputting a phase error signal from a phase detector 10 and input signal phase contrast becomes large rather than pi/2 If the output signal of a low pass filter 11 becomes large with the phase error signal from a phase detector 10 and input signal phase contrast becomes small rather than pi/2 conversely, it will design so that the output signal of a low pass filter 11 may also become small with the phase error signal from a phase detector 10.
[0021] Suppose first that wobble signal frequency was the value of f1 here. If the phase contrast between I/O in the dummy circuit 9 is smaller than pi/2 when this wobble signal is supplied to the dummy circuit 9, it will act so that the output signal of a low pass filter 11 may become small with the phase error signal from a phase detector 10. Then, if it is controlled so that the cut off frequency of the dummy circuit 9 will become low, if the output signal of a low pass filter 11 becomes small, and the cut off frequency of the dummy circuit 9 becomes low, the phase contrast between I/O in the dummy circuit 9 in the frequency f1 from the primary phase-shifting circuit property will become larger. If this feedback-loop actuation is repeated and the phase contrast between I/O in the dummy circuit 9 becomes pi/2 soon, the phase error signal from a phase detector 10 is lost, and in order that the output signal of a low pass filter 11 may hold the value in that time, the phase contrast between I/O in the dummy circuit 9 will also be held to pi/2.
[0022] Next, wobble signal frequency presupposes that it changed to the bigger value f2 than f1. Then, it is controlled so that it becomes larger on a frequency f2 than pi/2 although the phase contrast between I/O of the dummy circuit 9 was pi/2 on the frequency f1, and the output signal of a low pass filter 11 begins to go up with the phase error signal from a phase detector 10 and the cut off frequency of the dummy circuit 9 becomes high as a result, and the phase contrast between the I/O in a frequency f2 becomes small toward pi/2, and it goes. Soon, if the phase contrast between I/O in the dummy circuit 9 in a frequency f2 becomes pi/2, the phase error signal from a phase detector 10 is lost, and in order that the output signal of a low pass filter 11 may hold the value in the time, the phase contrast between I/O in the dummy circuit 9 will also be held to pi/2.
[0023] As mentioned above, the filter control circuit 12 is controlled so that the phase contrast between I/O in the dummy circuit 9 becomes pi/2 in the inputted wobble signal frequency. That is, the cut off frequency of the dummy circuit 9 follows wobble signal frequency. Then, when the phase contrast between I/O of the dummy circuit 9 is pi/2, even if it changes wobble signal frequency by designing the cut off frequency of a band pass filter 8 so that the center frequency of the passage signal band of the band pass filter 8 with which the same control signal is added may turn into wobble signal frequency, the center frequency and wobble signal frequency of a passage signal band of a band pass filter 8 are always in agreement.
[0024] Namely, since it becomes unnecessary to be able to cancel un-arranging [that a wobble signal band and

the signal passband of a band pass filter will shift], consequently to extend the signal passband of a band pass filter more than a wobble signal band, the read-out signal of a noise or others is mixed and outputted to a wobble signal, and it is effective in the ability to prevent that S/N deteriorates. And since the cut-off frequency variation of the band pass filter 8 by absolute value dispersion of the resistance at the time of integrating or a capacitor element is similarly amended on the basis of wobble signal frequency, it is suitable for integration.
[0025] Drawing 3 is the circuit diagram showing the example of 1 configuration of the primary phase-shifting circuit used as a dummy circuit 9 explained by drawing 1 . In this drawing, in Q1-Q15, a transistor resists, and, as for a capacitor, and R1-R7, C1 resists. It is the input terminal with which the signal with which the input terminal and T four to which the wobble signal with which reversal amplifier and Vcc were outputted for 18 and a current source and T3 were outputted for a circuit power source and A1 from the band pass filter 8 is supplied control the output terminal of a primary phase-shifting circuit, and T5 controls a cut off frequency is supplied.
[0026] The input edge of the reversal amplifier 18 is connected with the base of a transistor Q1 at input terminal T3, resistance R1 is connected between the emitters of transistors Q1 and Q2, and the emitter of transistors Q1 and Q2 is connected to the collector of transistors Q14 and Q15, respectively. The collector of a transistor Q1 is connected to the base collector of a transistor Q3, and the base of a transistor Q7, and the collector of a transistor Q2 is connected to the base collector of a transistor Q4, and the base of a transistor Q6. The emitter of a transistor Q3 is connected to the emitter of a transistor Q4, and the emitter of a transistor Q5, and the base collector of a transistor Q5 is connected to the circuit power source Vcc. The emitter of a transistor Q6 is connected with the emitter of a transistor Q7, and the collector of a transistor Q11, the collector of a transistor Q6 is connected to the base collector of a transistor Q8, and the base of a transistor Q9, and the emitter of a transistor Q8 and a transistor Q9 is grounded, and constitutes current Miller circuit. The collector of a transistor Q7 is connected to the collector of a transistor Q9, the base of a transistor Q10, and the end of a capacitor C1. As for the other end of a capacitor C1, the outgoing end of the reversal amplifier 18 is connected. The collector of a transistor Q10 is grounded, and the emitter of a transistor Q10 is connected to the base of output terminal T four and a transistor Q2 at the same time it connects with the circuit power source Vcc through a current source A1. The base collector of a transistor Q12 is connected to the base of an input terminal T5 and a transistor Q11, it connects with the circuit power source Vcc through resistance R2 and resistance R3, and the emitter of a transistor Q11 and a transistor Q12 constitutes current Miller circuit. It connects with the base of transistors Q14 and Q15, and each emitter of transistors Q13, Q14, and Q15 is grounded respectively through resistance R5, R6, and R7, and constitutes current Miller circuit at the same time the base collector of a transistor Q13 is connected to the circuit power source Vcc through resistance R4.
[0027] Next, actuation is explained. first, current Io which will flow a transistor Q13 if the electrical-potential-difference value of Vbe and the circuit power source Vcc is set [the resistance of resistance R4 / the resistance of R4 and resistance R5] to Vcc for R5 and the electrical potential difference between base emitters of a transistor Q13 Io =(Vcc-Vbe)/(R4+R5) .... If it is expressed with the (1) type above-mentioned (1) type and the resistance of resistance R5 and resistance R6 and R7 considers as an equal Current Io equal to a transistor Q13 also to a transistor Q13 and the transistors Q14 and Q15 which constitute a current mirror It becomes the operating point current on which it flows and this flows transistors Q3 and Q4 regularly.
[0028] moreover, the control current value supplied to the input terminal T5 -- 2 and If ** -- if it carries out, transistors Q6 and Q7 will be supplied by the current mirror with transistors Q11 and Q12 as the flowing total current -- having -- transistors Q6 and Q7 -- each operating point current which flows regularly -- If It becomes.

[0029] The circuit which consists of transistors Q3, Q4, Q6, and Q7 It is the current which flows I1, I2, and transistors Q6 and Q7 in the current which it is well known according to the current ratio which flows transistors Q3 and Q4 that it is the circuit where the current ratio which flows transistors Q6 and Q7 changes, and flows transistors Q3 and Q4 I3 and I4 If it carries out I1 : I2 =I4 : I3 .... It has the relation shown in the (2) type above-mentioned (2) type.
[0030] Moreover, as shown in the following (3) types, when the ratio of the total current value which flows transistors Q3 and Q4, and the total current value which flows transistors Q6 and Q7 is set to M, M expresses the amplification factor of the signal current.
[0031]
M=(I3+I4)/(I1+I2) =If / Io .... The amplification factor M of the signal current is controlled by changing the

control current value supplied from an input terminal T5 more clearly than the (3) type above-mentioned (3) type.

[0032] The signal level inputted from input terminal T3 is changed into the signal current on the differential pair-of-observations way which consists of transistors Q1 and Q2 and resistance R1. Transistors Q3 and Q4 are flowed. M The signal current with transistors Q6 and Q7 the flowing signal current a transistor Q6 by being changed into the doubled signal current The differential current of the current which flows a transistor Q9 through the current Miller circuit which consists of transistors Q8 and Q9, and flows a transistor Q9, and the signal current which flows a transistor Q7 by flowing into a capacitor C1 The signal current is taken out as an integral electrical potential difference, and the integral electrical potential difference is supplied to the base of output terminal T four and a transistor Q2 through the emitter follower circuit which consists of a transistor Q10 and a current source A1.

[0033] the difference electrical potential difference between the bases of now and transistors Q1 and Q2 -- the resistance of deltaV and resistance R1 -- R1 ** -- the signal current I1 which will flow transistors Q3 and Q4 if it carries out, and I2 I1 =Io+deltaV/R1 .... (4) Formula I2 =Io-deltaV/R1 .... the signal currents I3 and I4 which serve as the (5) type above-mentioned (4) type and (5) types, and flow transistors Q6 and Q7 I4 =M-I1 =M (Io+deltaV/R1) .... (6) Formula I3 =M-I2 =M (Io-deltaV/R1) .. It is expressed with the (7) type above-mentioned (6) type and (7) types.

[0034] The signal current Is which flows into a capacitor C1 from this The above-mentioned (6) - (7) type Is =I4-I3 =2 M-delta V/R1 .... It is expressed with the (8) type above-mentioned (8) type.

[0035] Here gm=2 M/R1 .... When it sets with (9) A formula, the above-mentioned (8) formula Is = gm-delta V .... Above gm shows the mutual-conductance value which changes difference electrical-potential-difference between the bases deltaV of transistors Q1 and Q2 into the signal current Is which flows into a capacitor C1 by becoming the (10) type above-mentioned (10) type, and it is the signal current Is. It is taken out from a capacitor C1 as an integral electrical potential difference.

[0036] That is, 19 shown with the broken line in drawing 3 is an amplifying circuit which carries out the current conversion output of the volt input, is combined with a capacitor C1 and constitutes an integrating circuit.

[0037] Then, if the amplification factor of C1 and the reversal amplifier 18 is set to -1 for the value of Vo and a capacitor C1, the signal outputted from Vi and output terminal T four in the signal inputted from input terminal T3 deltaV=Vi-Vo (11) .... formula Vo =-Vo+ {Is/(S-C1)} (12) .. a formula, however S become the Laplacian operator above-mentioned (11) type and (12) types.

[0038] By the above-mentioned (9) type - (12) type, if it asks for a transfer function H1 (s) H1(s) =Vo/Vi =(S-omegao)/(S+omegao) .... It becomes the (13) type above-mentioned (13) type, and is cut-off-frequency omegao. omegao=gm/C1 =2M/(C1 and R1) .. It becomes (14) type above (14).

[0039] As the filter circuit shown in drawing 3 expresses the primary phase-shifting circuit property that the amplitude characteristic is a flat and only a phase changes and cut-off-frequency omegao which is the parameter of a filter circuit proper was shown in the aforementioned (3) formula from the above-mentioned (14) types so that clearly from the above-mentioned (13) types, adjustable [of the signal current amplification factor M] is controlled and carried out by the control current value from the low pass filter 11 supplied from an input terminal T5.

[0040] And the actuation explained by drawing 1 can be obtained by constituting the band pass filter 8 explained by drawing 1 using the integrating circuit which combined with drawing 3 the amplifying circuit 19 shown with the broken line, and the capacitor. The example of a configuration is shown in drawing 4 .

[0041] Drawing 4 is the block diagram showing the example of 1 configuration of a band pass filter 8, and is set to this drawing. The input terminal into which the regenerative signal with which T6 was supplied from the pickup circuit 3 is inputted, The output terminal to which the wobble signal with which T7 was extracted is outputted, the input terminal with which the control signal with which T8 was outputted from the low pass filter 11 is supplied, and 21 and 22 It is the voltage source which the amplifying circuit which changes and outputs the same input voltage as the amplifying circuit 19 shown in drawing 3 with the broken line to a signal level, and C21 and C22 give a capacitor to, and Vb gives circuit action potential.

[0042] In drawing 4 , the plus input edge of an amplifying circuit 21 is connected to a voltage source Vb, the current outgoing end of an amplifying circuit 21 is connected to a capacitor C21 and the plus input edge of an amplifying circuit 22, and the other end of a capacitor C21 is connected to an input terminal T6. While connecting with a capacitor C22 and an output terminal T7, feedback connection of the current outgoing end of

an amplifying circuit 22 is made at the minus input edge of an amplifying circuit 21 and an amplifying circuit 22. The mutual-conductance value is controlled by the signal into which the amplifying circuit 21 and the amplifying circuit 22 were inputted from the input terminal T8.

[0043] the mutual-conductance value of now, an amplifying circuit 21, and an amplifying circuit 22 -- gm1 and the signal outputted from Vi and an output terminal T7 in the signal into which the capacity value of gm2, a capacitor C21, and a capacitor C22 is inputted from C21 and C22, and an input terminal T6 -- Vo ** -- when it carries out, a transfer function H2 (S) is expressed with a bottom type.

[0044]

[Equation 1]

$$H_{2(s)} = \frac{V_o}{V_i} = \frac{\frac{\omega o}{Q} S}{S^2 + \frac{\omega o}{Q} S + \omega o^2} \quad \cdots\cdots (15)式$$

$$\omega o^2 = \frac{g m_{21} \cdot g m_{22}}{C_{21} \cdot C_{22}} \quad \cdots\cdots (16)式$$

$$Q^2 = \frac{C_{22} \cdot g m_{21}}{C_{21} \cdot g m_{22}} \quad \cdots\cdots (17)式$$

[0045] From the above-mentioned (15) formula, the circuit shown in drawing 4 shows the secondary band pass filter property, with the control signal inputted from the input terminal T8, the mutual-conductance values gm21 and gm22 are controlled, and cut-off-frequency omegao which is the parameter of a filter circuit proper can carry out adjustable [of them], as drawing 3 explained.

[0046] Drawing 5 is the block diagram showing the configuration of the optical disk record regenerative apparatus concerning the 2nd operation gestalt of this invention, in this drawing, the same sign is given to a previous operation gestalt and an equal thing, and the explanation is omitted in order to avoid duplication (this is the same also in each following operation gestalt).

[0047] In drawing 5 , 23 is the waveform equalization circuit which constituted the waveform equalization circuit 5 explained by drawing 1 from a band pass filter 8 and an active filter which can carry out adjustable [of the same cut off frequency], the output of the low pass filter 11 of the filter control circuit 12 is supplied, and a cut off frequency is controlled. 24 is the oscillator circuit equipped with the control input by which an oscillation frequency is controlled apart from the signal supplied from the low pass filter 14, the output of the low pass filter 11 of the filter control circuit 12 is supplied as the control input, and the oscillation period of an oscillator circuit 24 has become circuitry with the time constant of the active filter used for the bandpass 8, and correlation.

[0048] When the wobble signal frequency read by the optical pickup changes, the frequency band which the frequency of the recording information signal supplied to a waveform equalization circuit 23 through AGC circuit 4 from the pickup circuit 3 is changing similarly, and should carry out emphasis amendment in a waveform equalization circuit 23 also changes. Then, it enables it to correspond also to frequency change of a recording information signal in this operation gestalt shown in drawing 5 by the cut off frequency of a band pass filter 8 being interlocked with, and controlling the cut off frequency of a waveform equalization circuit 23. moreover, the cut-off frequency variation of the waveform equalization circuit 23 according to absolute value dispersion of resistance within IC, or a capacitor element when these circuits are integrated -- resistance within IC, and the ratio of a capacitor element -- since it can amend using the description in which precision is excellent, it is suitable for integration.

[0049] He is trying to control the oscillation frequency of an oscillator circuit 24 by the output of the low pass filter 11 of the filter control circuit 12 in this operation gestalt. Moreover, by this Since the free running frequency of an oscillator circuit 24 changes according to fluctuation of wobble signal frequency, Are effective in the frequency drawing-in response by closed-loop actuation of a phase lock loop 17 being improvable. furthermore, the self-propelled frequency variation of the oscillator circuit 24 according to absolute value

dispersion of resistance within IC, or a capacitor element when it integrates -- resistance within IC, and the ratio of a capacitor element -- since it can amend using the description in which precision is excellent, it is suitable for integration.

[0050] Moreover, the phase lock loop 7 of the same effectiveness being acquired from the same configuration as the phase lock loop 17 mentioned above, then the cut off frequency of a band pass filter 8 being interlocked with similarly, and an oscillation frequency being controlled is also clear. That is, it is applicable to the time constant of the active filter used for the band pass filter 8 else [, such as the waveform equalization circuit 23 mentioned above and an oscillator circuit 24,], and the circuit of others using a time constant component with correlation.

[0051] Drawing 6 is the block diagram showing the configuration of the optical disk record regenerative apparatus concerning the 3rd operation gestalt of this invention, and it is the switch which is controlled by the signal into which T9 was inputted into from the input terminal, and 20 was inputted from the input terminal T9, and supplies or intercepts the output of a phase detector 10 to a low pass filter 11 in this drawing.

[0052] The case where a wobble signal is missing in the part by which the truck with which a wobble signal is recorded became intermittent when the positional information of a disk etc. was minced as a pit at the head of each truck, therefore positional information was minced can be considered. In that case, when the input signal used as the criteria of the filter control circuit 12 is missing, the feedback control loop in the filter control circuit 12 malfunctions. Then, in this operation gestalt shown in drawing 6 , with the period when a wobble signal is missing, and the signal inputted from the input terminal T9, a switch 20 is opened wide and the output of a phase detector 10 is intercepted. ** -- by making it a configuration [like], it originates in lack of a wobble signal and is effective in the ability to prevent that the filter control circuit 12 malfunctions.

[0053] Drawing 7 is the block diagram showing the configuration of the optical disk record regenerative apparatus concerning the 4th operation gestalt of this invention, and 25 is a switch which is controlled by the signal inputted from the input terminal T9, and supplies or intercepts the output of a phase detector 13 to a low pass filter 14 in this drawing.

[0054] When the switch 25 is added to the configuration of the above mentioned 3rd operation gestalt of drawing 6 in this operation gestalt shown in drawing 7 , a wobble signal is missing, and the input of a phase lock loop 17 is lost In order to prevent that a phase-locked loop malfunctions, with the period when a wobble signal is missing, and the signal inputted from the input terminal T9, a switch 25 is opened wide and the output of a phase detector 13 is intercepted. ** -- making it a configuration [like] -- the effectiveness of said 3rd operation gestalt -- in addition, it originates in lack of a wobble signal and is effective in the ability to prevent that a phase-locked loop malfunctions.

[0055] Drawing 8 is the block diagram showing the configuration of the optical disk record regenerative apparatus concerning the 5th operation gestalt of this invention, and is set to this drawing. The optical pickup which 26 reads information from an optical disk 1 optically, and is changed into an electrical signal, A drive circuit for the amplifying circuit where 27 amplifies the electrical signal from an optical pickup 26, and 28 to move the location of an optical pickup 26, The criteria oscillator circuit where the drive circuit where 29 rotates a spindle motor 2, and 30 generate a servo circuit, and 31 generates a reference clock, and 32 are adder circuits.

[0056] A spindle motor 2 is driven in the drive circuit 29, rotates an optical disk 1, and supplies the signal according to the number of rotations to the servo circuit 30. Driving an optical pickup 26 in the drive circuit 28, and changing the location, from an optical disk 1, a signal is read, and the read signal is amplified in an amplifying circuit 27, and is supplied to AGC circuit 4, a band pass filter 8, and the servo circuit 30, respectively.

[0057] The servo circuit 30 operates in the reference clock generated in the criteria oscillator circuit 31. The information which the address information and the optical pickup 26 which are obtained from the signal according to the rotational frequency from a spindle motor 2 and the signal from an amplifying circuit 27, and which were read cross a truck, and move, From the wobble signal extracted with the band pass filter 8, it controls through the drive circuit 28 to each predetermined value which considers the rotational frequency of a spindle motor 2 as a constant linear velocity or rotational-speed regularity through the location and the drive circuit 29 of an optical pickup 26.

[0058] That is, since there are rotational speed of an optical disk 1 and information on the read-out location of an optical pickup 26 etc. in the servo circuit 30 and these information and the frequency of a wobble signal have a correlation, it is possible to presume the frequency of the wobble signal read from an optical disk 1.

[0059] Then, in the servo circuit 30, from the rotational speed of an optical disk 1, and the information on the read-out location of an optical pickup 26 etc., the control signal corresponding to the wobble signal frequency read from an optical disk 1 is generated, it adds with the control signal from a low pass filter 11 in an adder circuit 32, and the cut off frequency of a band pass filter 8 and the dummy circuit 9 is controlled. Then, a band pass filter 8 and the dummy circuit 9 are controlled by the servo circuit 30 to change of the wobble signal frequency read from an optical disk 1, and control amendment of the cut-off frequency variation of a band pass filter 8 and the dummy circuit 9 by the resistance at the time of integrating, absolute value dispersion of a capacitor element, etc. is carried out by the control signal fed back from a low pass filter 11.
[0060] Thus, by distributing the function to amend, a control range can be extended compared with the case where it amends only in the filter control circuit 12. When there is lack of the wobble signal by a blemish, dirt, etc. of an optical disk 1, furthermore, in the servo circuit 30 Since signal generation of the wobble signal frequency read can be presumed and carried out from the rotational speed of the optical disk 1 just before it becomes impossible to read information by the blemish, and the information on the read-out location of an optical pickup 26 etc., It is effective in the ability to press down to min malfunction that a cut off frequency will shift greatly, with restricting the control signal change width of face from a low pass filter 11. Moreover, like old explanation, like a band pass filter 8, the time constant of a waveform equalization circuit 5 and a phase lock loop 17 is controlled, and absolute value dispersion of the resistance at the time of following and integrating to frequency change of the signal read from an optical disk or a capacitor element can be amended using the output of an adder circuit 32.
[0061] Drawing 9 is the block diagram showing the configuration of the optical disk record regenerative apparatus concerning the 6th operation gestalt of this invention. This operation gestalt shown in drawing 9 operates more the circuit explained by drawing 8 to stability to lack of the read-out signal by a blemish, dirt, etc. of an optical disk 1.
[0062] In drawing 9 , 33 is a defective detector, the signal supplied to AGC circuit 4 from an amplifying circuit 27 is supplied also to this defective detector 33, and the output of the defective detector 33 controls a switch 20.
[0063] If the wave which signal lack as shown in a of drawing 10 produced is added to the input of the defective detector 33, in the output of the defective detector 33, the signal with which only the period which carries out signal lack serves as Hi level like the wave shown in b of drawing 10 will occur. Since the period and switch 20 used as Hi level of this signal can hold the level before the output of a low pass filter 11 produces signal lack by intercepting the output of a phase detector 10, they can prevent malfunction that the cut off frequency of a band pass filter 8 will shift, by signal lack. Moreover, there is effectiveness which it becomes unnecessary to restrict the control signal change width of face from the low pass filter 11 which was explained by drawing 8 , and can make large the control range of the filter control circuit 12. Moreover, the output of the defective detector 33 is supplied to the signal detector 6, and it can be used also for preventing malfunctioning at the period when a phase lock loop 7 produces signal lack.
[0064] Drawing 11 is the block diagram showing the configuration of the optical disk record regenerative apparatus concerning the 7th operation gestalt of this invention, and, for 34, as for a frequency divider and 36, a servo circuit and 35 are [a change-over circuit and T10] input terminals in this drawing.
[0065] The signal output which controls the division ratio of a frequency divider 35 is applied to the servo circuit 30 explained by drawing 8 , and the servo circuit 34 carries out dividing of the reference clock in which adjustable [of the frequency divider 35] was carried out, and the division ratio generated it with the signal from the servo circuit 34 in the criteria oscillator circuit 31. With the change-over signal supplied from the input terminal T10, the change-over circuit 36 chooses the output of an amplifying circuit 27, or the output of a frequency divider 35, and carries out signal supply to a band pass filter 8. While the change-over circuit 36 chooses the output of an amplifying circuit 27 and is carrying out signal supply to the band pass filter 8 with the change-over signal supplied from the input terminal T10, the same actuation as what was explained by drawing 8 is performed.
[0066] The signal which controls the division ratio of a frequency divider 35 can make a false wobble signal from a reference clock by controlling by the servo circuit 34 to become equal to the rotational speed of an optical disk 1, and the frequency of the wobble signal which the output of a frequency divider 35 has read by the optical pickup 26 based on the information on the read-out location of an optical pickup 26, as drawing 8 also explained.
[0067] Now, even if an optical disk 1 is also that of the method which is not recording the wobble signal, the

false wobble signal has occurred like the time of having read the optical disk of the method which there is information on rotational speed and the read-out location of an optical pickup 26 in the servo circuit 34, therefore recorded the wobble signal on the output of a frequency divider 35. In the case of the method with which the optical disk 1 is not recording the wobble signal, then, by inputting the change-over signal according to the method of an optical disk from an input terminal T10 By choosing the output of a frequency divider 35 and carrying out signal supply to a band pass filter 8 Like the case where the optical disk which is recording the wobble signal is read The time constant of a band pass filter 8, a waveform equalization circuit 5, and a phase lock loop 17 is controllable, and while following frequency change of the signal read from an optical disk 1, absolute value dispersion of the resistance at the time of integrating or a capacitor element can be amended. That is, the equipment which can respond to both the optical disk of the method which is recording the wobble signal, and the optical disk of the method which is not recording the wobble signal is realizable.

[0068] Drawing 12 is the block diagram showing the configuration of the optical disk record regenerative apparatus concerning the 8th operation gestalt of this invention. This operation gestalt shown in drawing 12 operates more the circuit explained by drawing 11 to stability to lack of the read-out signal by a blemish, dirt, etc. of an optical disk 1.

[0069] In drawing 12 , 37 is a defective detector and 38 is a change-over circuit. The signal supplied to AGC circuit 4 from an amplifying circuit 27 is supplied also to the defective detector 37, and, on the other hand (b shown in drawing 12), is supplied to the change-over circuit 38 and the signal detector 6 between two detection outputs of the defective detector 37, and another side (c shown in drawing 12) is supplied to a switch 20, a phase lock loop 17, and the signal detector 6. Moreover, the change-over circuit 38 is controlled by the detection output of a change-over signal and the defective detector 37 supplied from the input terminal T10, chooses the output of an amplifying circuit 27, or the output of a frequency divider 35, and carries out signal supply to a band pass filter 8.

[0070] A different point with the defective detector 33 explained by the defective detector 37 and drawing 9 has the defective detector 37 in the place equipped with two detection outputs. When the wave which signal lack as shown in a of drawing 13 produced is added to the input of the defective detector 37, for one output of the defective detector 37 The signal with which only the period which carries out signal lack serves as Hi level like the wave shown in b of drawing 13 is generated. For the output of another side When the period which carries out signal lack is larger than tau like the wave shown in c of drawing 13 , the signal with which only constant value tau serves as Hi level from the time of signal lack occurring is generated, and when the period which carries out signal lack is smaller than tau, the signal with which only the period which carries out signal lack serves as Hi level is generated. Here, the wave of a, and b and c shown in drawing 13 corresponds to a of the signal shown in drawing 12 , and b and c, respectively.

[0071] In drawing 12 , two detection outputs b and c of this defective detector 37 perform the following actuation.

[0072] First, when the signal used as Hi level occurs when signal lack is detected, and a switch 20 intercepts the output of a phase detector 10 with this signal, the detection output c holds on the level before signal lack produces the output of a low pass filter 11, and as drawing 7 also explained the phase lock loop 17 with the detection output c, it holds that actuation. However, when the period which produces signal lack is long since the output of a low pass filter 11 changes with the leakage currents etc. with time amount even if it is intercepting the output of a phase detector 10, the detection output c is returned to Lo level from Hi level by constant value tau, and a switch 20 supplies the output of a phase detector 10 to a low pass filter 11. Apart from this, when signal lack is detected, the signal used as Hi level occurs, and the detection output b of the defective detector 37 controls the change-over circuit 38 by this signal, and supplies the false wobble signal which is the output of a frequency divider 35 to a band pass filter 8. Even if the change-over circuit 38 is controlled to choose the output of an amplifying circuit 27 with the change-over signal supplied from the input terminal T10, it gives priority to control of the detection output b.

[0073] Thereby, from a band pass filter 8, when the detection output c returns from Hi level to Lo level by constant value tau, since signal lack is compensated with the false wobble signal being outputted, also when the period which produces this signal lack is long, it is effective in the ability to prevent malfunction.

[0074] Drawing 14 is the block diagram showing the example of 1 configuration of the defective detector 37 explained by drawing 12 , and, for AM detector circuit and 40, as for a voltage source and 42, a comparator and 41 are [the output terminal which outputs the detecting signals b and c which explained the input terminal with

which the output signal a of the amplifying circuit 27 which explained T11 by drawing 12 is supplied, and T12 and T13 by drawing 12 , and 39 / a mono-multivibrator and 43] AND circuits in this drawing.
[0075] The signal a supplied from the input terminal T11 is detected in the AM detector circuit 39, is supplied to a comparator 40, and if Signal a decreases on the basis of the electrical-potential-difference value of a voltage source 41 (signal lack section shown in drawing 13), the output of a comparator 40 will change to Hi level, and it will supply it to an output terminal T12 as a detecting signal b. Moreover, the output of a comparator 40 is supplied to the mono-multivibrator 42, only tau explained by drawing 13 from the time of the output of a comparator 40 changing from Lo level to Hi level outputs the signal of Hi level, and the mono-multivibrator 42 can obtain a detecting signal c to an output terminal T13 by taking AND of the output of a comparator 40, and the output of the mono-multivibrator 42 with AND circuit 43.
[0076] Moreover, what is necessary is to be able to use the defective detector 37 shown in drawing 14 also as a defective detector 33 stated by drawing 9 , and just to consider an output terminal T12 as the output of the defective detector 33 in that case.
[0077] Drawing 15 is the block diagram showing the configuration of the optical disk record regenerative apparatus concerning the 9th operation gestalt of this invention. The binary-ized circuit which makes an analog signal binary in drawing 15 for digital processing of the information signal with which 44 was supplied to the signal detector 6, and 45 The latch circuit which latches the information signal made binary with a synchronous clock, and outputs the synchronized information signal to an output terminal T1, The synchronous detector which detects the synchronizing signal with which 46 is inserted at fixed spacing into the information signal, the phase lock loop where 47 generates a playback reference clock from a synchronizing signal, and 48 The change-over circuit which is controlled by the signal inputted from the input terminal T10, and chooses the output of a phase lock loop 47 or the output of a phase lock loop 17, and 49 Referring to the playback reference clock by which the selection output was carried out in the change-over circuit 48 The phase lock loop which generates the synchronous clock which carried out phase simulation to the information signal from the binary-ized circuit 44, the frequency divider where 50 carries out dividing of the synchronous clock, and 51 It is the change-over circuit which is controlled by the signal inputted from the input terminal T10, and chooses the output of the pickup circuit 3, or the output of a frequency divider 50.
[0078] In the case of the optical disk with which the optical disk 1 recorded the wobble signal, now with the signal inputted from the input terminal T10 As shown in drawing 15 , when the change-over circuit 51 chooses the output of the pickup circuit 3 and the change-over circuit 48 chooses the output of a phase lock loop 17 The time constant of a band pass filter 8, a waveform equalization circuit 5, and a phase lock loop 17 is controlled by the control signal which the filter control circuit 12 generated the same with having explained until now according to the frequency of the wobble signal extracted with the band pass filter 8.
[0079] Moreover, in the case of the optical disk of the method with which an optical disk 1 does not use a wobble signal, with the signal inputted from the input terminal T10, the change-over circuit 51 chooses the output of a frequency divider 50, and the change-over circuit 48 chooses the output of a phase lock loop 47. The phase lock loop 47 has generated the playback reference clock from the synchronizing signal detected in the synchronous detector 46, and a phase lock loop 49 generates the phase simulation synchronous clock based on the frequency of this playback reference clock in an information signal. Therefore, the frequency of a synchronous clock follows the read-out signal band which changes with the rotational frequency of an optical disk 1, and the read-out locations of the pickup circuit 3. Then, a false wobble signal which explained this synchronous clock by drawing 11 by the thing which carry out dividing in a frequency divider 50, and to do can be generated. However, since the synchronous-clock frequency itself follows the read-out signal band which changes with the rotational frequency of an optical disk 1, and the read-out locations of the pickup circuit 3 with this operation gestalt of drawing 15 , it is not necessary to carry out adjustable [of the division ratio of a frequency divider 50], and it is good at constant value.
[0080] There is effectiveness which can also amend the resistance at the time of integrating that characteristic strip regions, such as a signal band which is read in any [of the optical disk of the method which does not use by this the optical disk or wobble signal with which the optical disk 1 recorded the wobble signal] case, a band pass filter 8, and a waveform equalization circuit 5, shift like the operation gestalt which could be prevented and was explained until now, and the time constant fluctuation by absolute value dispersion of a capacitor element.
[0081] Next, the example of a configuration of others of the band pass filter 8 used as the extract filter which extracts a wobble signal is shown in drawing 16 , drawing 17 , and drawing 18 , respectively.

[0082] In drawing 16 , 52 is a high-pass filter and 53 is a low pass filter. The wobble signal which was supplied from the pickup circuit 3 from the input terminal T6 and which it read, and the signal was inputted, oppressed the unnecessary signal band with the high-pass filter 52 and the low pass filter 53, and was extracted is outputted from an output terminal T7. From an input terminal T8, the control signal outputted from the filter control circuit 12 is supplied, and the cut off frequency of the band pass filter 8 explained so far is controlled by controlling the cut off frequency of a high-pass filter 52 and a low pass filter 53 by this control signal.
[0083] Thus, by combining a high-pass filter 52 and a low pass filter 53, it becomes easy to carry out a property setup as an extract filter which extracts a wobble signal, for example, a low-pass oppression property can set up the oppression property of a high region with the property of a low pass filter 53 to wobble signal frequency by the high-pass filter 52 again to wobble signal frequency, respectively.
[0084] Moreover, it is what fixed the time constant of the high-pass filter 52 shown in drawing 16 in the example shown in drawing 17 , and the voltage source to which a capacitor and 55 supply resistance and, as for 56, 54 supplies bias, and 57 are high-pass filters constituted from a capacitor 54, resistance 55, and a voltage source 56 in drawing 17 .
[0085] In the example shown in drawing 17 , it is only a low pass filter 53 that a cut off frequency is controlled by the control signal from an input terminal T8, and an oppression property low-pass [by the high-pass filter 57] is fixed to wobble signal frequency. When there are few low-pass undesired signal components and an information signal component is distributed over a high region side to wobble signal frequency to wobble signal frequency, this is following fluctuation of the signal band where only the oppression property of a high region is read from an optical disk 1 to wobble signal frequency, and has the effectiveness which can simplify circuitry. Furthermore, there is an advantage which can set up a cut off frequency by choosing the capacity value of a capacitor 54 as arbitration later by what the capacitor 54 is made external [of an integrated circuit] for when integrating.
[0086] In the example shown in drawing 18 , the trap filter 58 is added to the configuration of drawing 16 , the trap filter 58 is inserted between a high-pass filter 52 and a low pass filter 53, and the cut off frequency (trap frequency) of the trap filter 58 is controlled by the control signal from an input terminal T8 like a high-pass filter 52 and a low pass filter 53.
[0087] In the example shown in drawing 18 , it is effective in the ability to acquire a more powerful oppression property by setting a trap frequency with the trap filter 58 as the band of the information signal read from an optical disk 1.
[0088] In addition, although each operation gestalt which was mentioned above and to which it came showed the example of application to an optical disk record regenerative apparatus, it cannot be overemphasized that this invention can be applied also to the optical disk unit only for playbacks.
[0089]
[Effect of the Invention] According to this invention, first as mentioned above to the 1st By controlling the cut off frequency of a band pass filter by the control signal generated in the filter control circuit Since it operates so that the cut off frequency of a band pass filter may always follow wobble signal frequency It is cancelable un-arranging [that a wobble signal band and the signal passband of a band pass filter will shift]. The read-out signal of a noise or others mixes in a wobble signal, and it becomes unnecessary to extend the signal passband of a band pass filter more than a wobble signal band, and is [it is outputted and] effective in the ability to prevent that S/N deteriorates. And the cut-off frequency drift of the band pass filter by absolute value dispersion of the resistance at the time of integrating or a capacitor element also has the effectiveness amended similarly, and is suitable for integration.
[0090] Moreover, since a band pass filter is interlocked with and the time constant of other time constant circuits can also be controlled by the control signal generated in the filter control circuit in the 2nd While the gap with a wobble signal band and the signal passband of a band pass filter can be prevented It can cancel un-arranging [that the signal band and the characteristic strip region of other time constant circuits which were read from the optical disk will shift], moreover, there is effectiveness which can be amended similarly also about the resistance at the time of integrating, or the time constant fluctuation by absolute value dispersion of a capacitor element, and it is suitable for integration.
[0091] By moreover, the thing for which the cut off frequency of a band pass filter is controlled by the 1st control signal generated in the filter control circuit, and the 2nd control signal generated in the servo circuit in the 3rd Since distributed actuation is carried out so that the 2nd control signal may amend to frequency change

of the signal read from an optical disk and the 1st control signal may amend to the cut-off frequency drift by resistance, absolute value dispersion of a capacitor element, etc. It is effective in reaching far and wide and making in agreement a wobble signal band and the signal passband of a band pass filter.

[0092] Moreover, it is effective in the ability to be able to offer the optical disk record regenerative apparatus which can be equivalent to the optical disk of a different method from being operated by the frequency divider which a division ratio is controlled by the servo circuit and carries out dividing of the reference clock like the case where the optical disk which recorded the wobble signal is read by using the wobble signal which carried out false generating when reading the optical disk of the method which is not recording the wobble signal to the 4th.

[0093] Moreover, it is effective in the ability to offer the optical disk record regenerative apparatus which can be equivalent to the optical disk of a different method from being operated by the frequency divider which carries out dividing of the synchronous clock which carried out phase simulation to the information signal like the case where the optical disk which recorded the wobble signal is read by using the wobble signal which carried out false generating when reading the optical disk of the method which is not recording the wobble signal to the 5th.

[Translation done.]

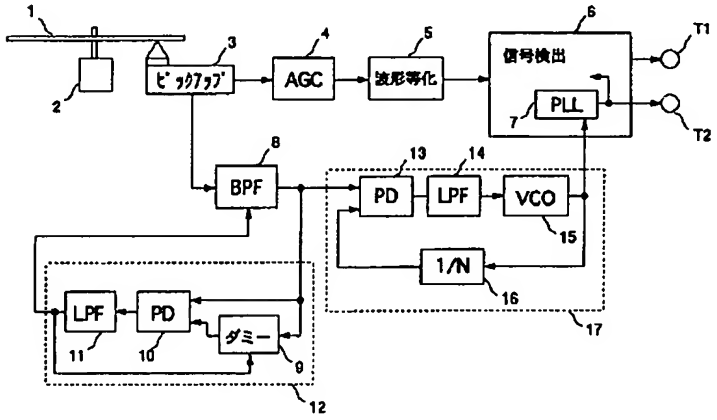
* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

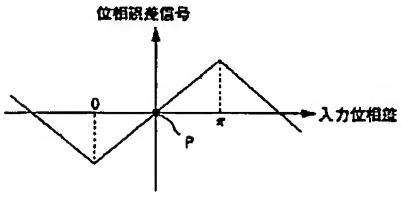
[Drawing 1]

図 1



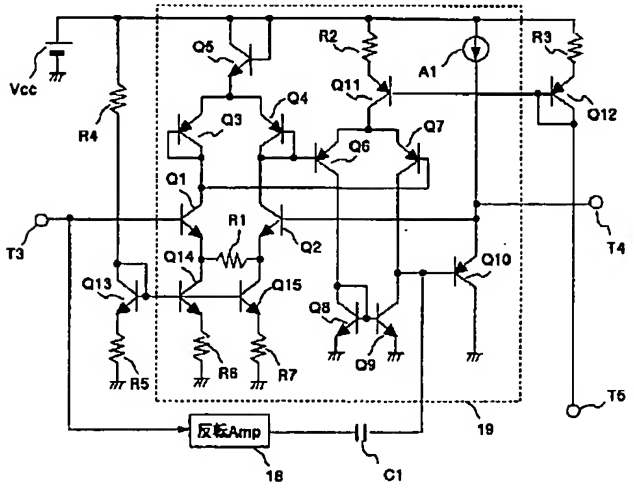
[Drawing 2]

図 2



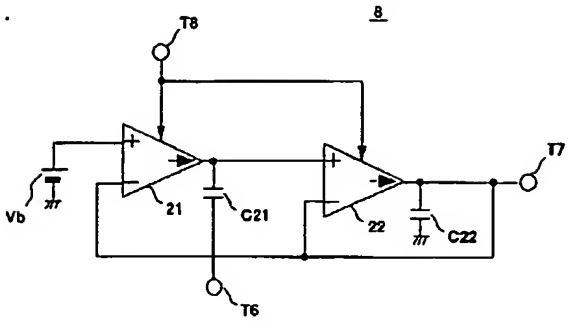
[Drawing 3]

図 3



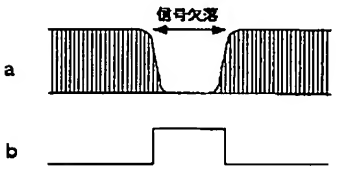
[Drawing 4]

図 4



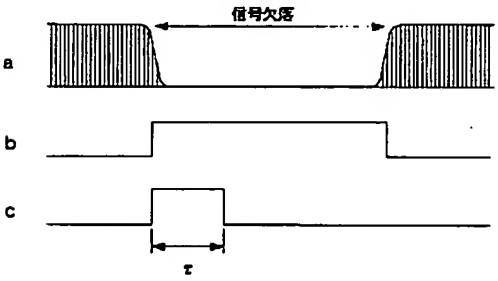
[Drawing 10]

図 1 0



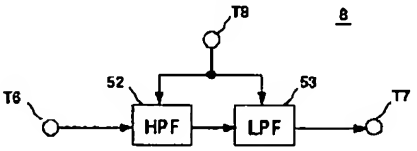
[Drawing 13]

図 1 3



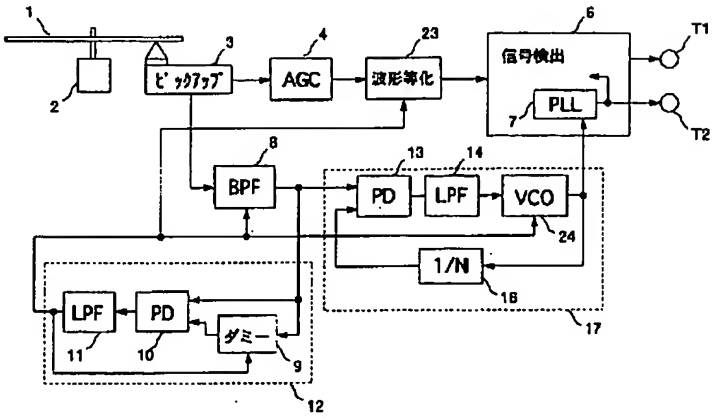
[Drawing 16]

図 1 6



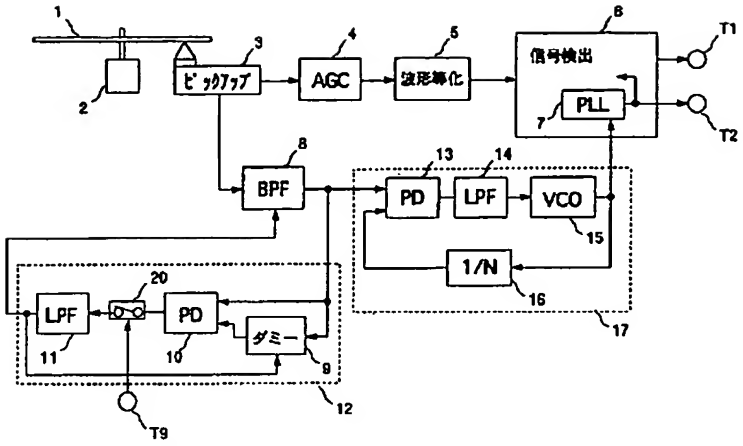
[Drawing 5]

図 5



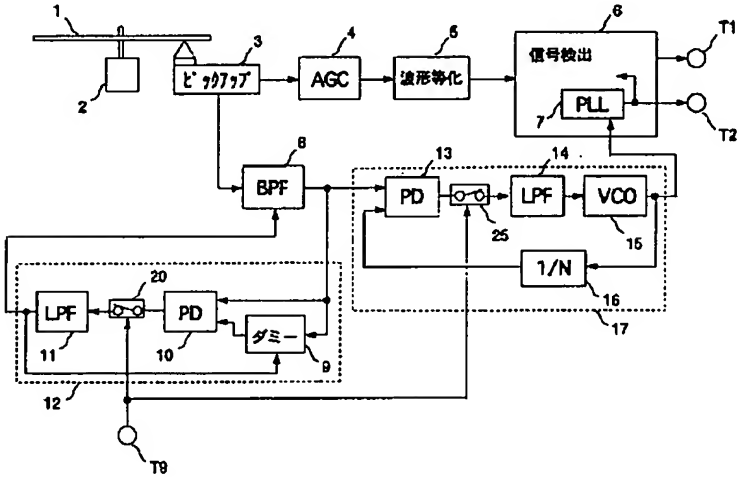
[Drawing 6]

図 6



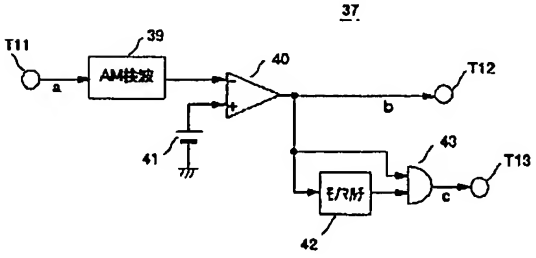
[Drawing 7]

図 7



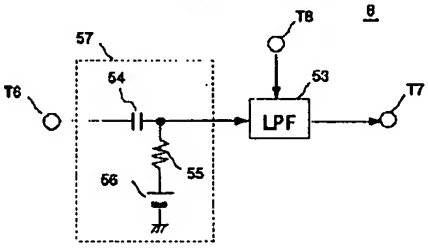
[Drawing 14]

図 14



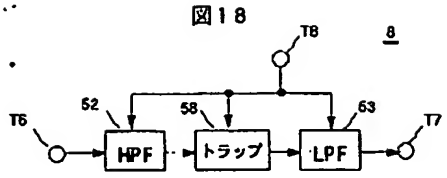
[Drawing 17]

図 17



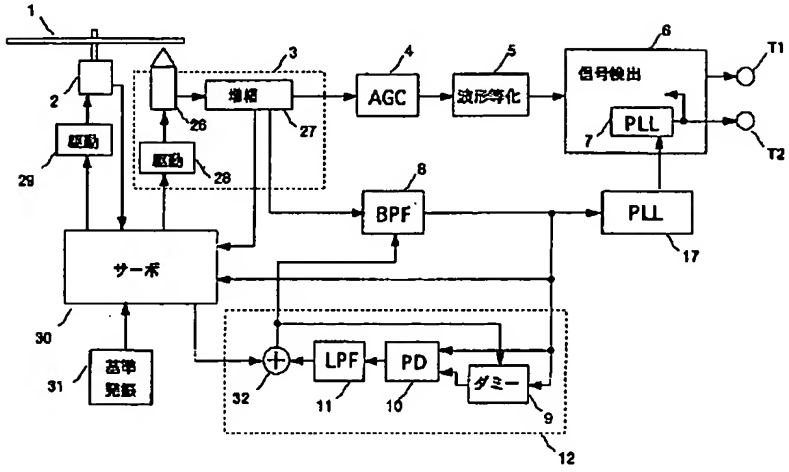
[Drawing 18]

図１８



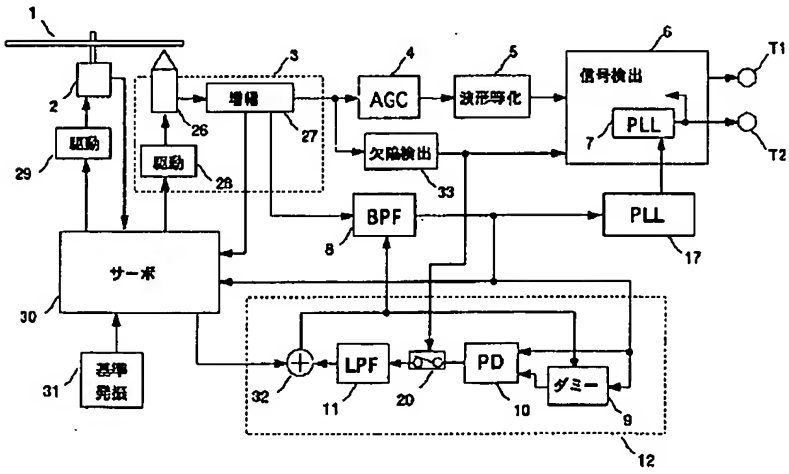
[Drawing 8]

図８



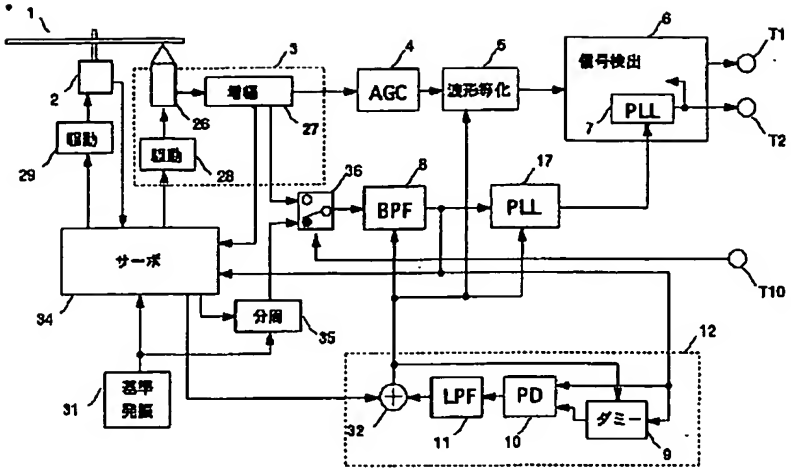
[Drawing 9]

図 9



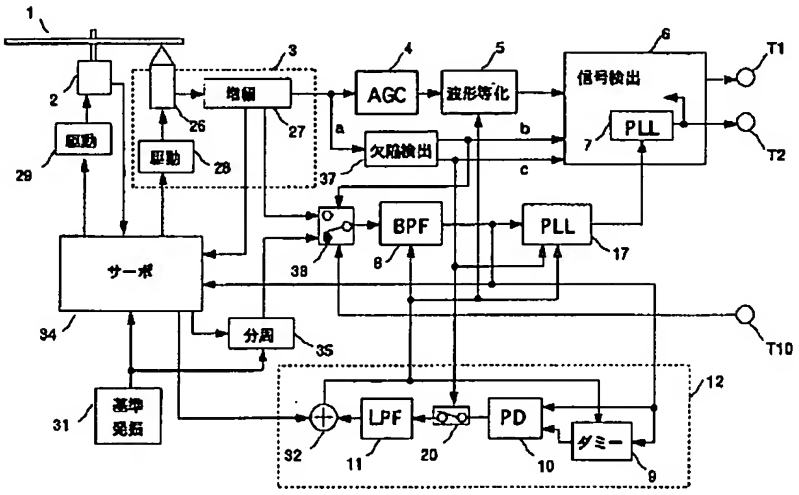
[Drawing 11]

図１１



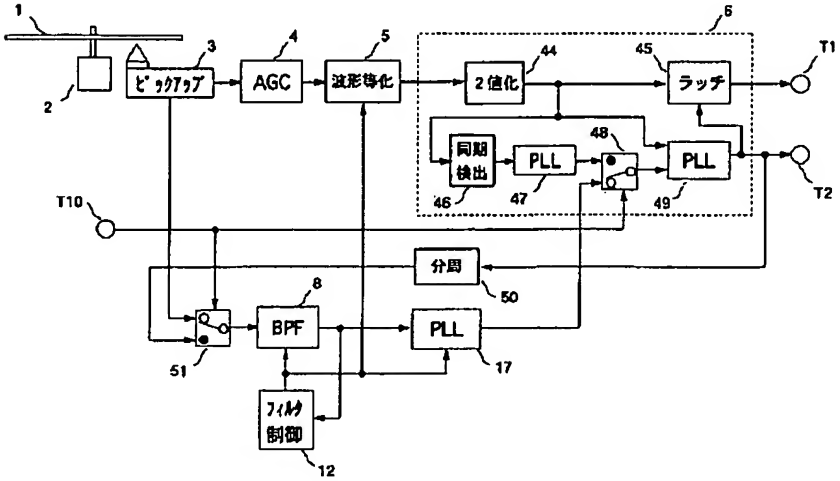
[Drawing 12]

図１２



[Drawing 15]

図１５



[Translation done.]